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ABSTRACT

This report describes the composition and operation of the library of the Gray Freshwater Biological Institute at the University of Minnesota, a non-traditional information service which provides information to the institute by combining the use of three bibliographic databases with current awareness services, OCLC, MINITEX, and author reprint request cards. The relationship of each of these sources to the library is discussed separately. Figures illustrate library retrieval procedures, and tables provide data on expenditures, request publication dates, number of requests, lending libraries, number of journals by lender, number of requests by lender, database costs, online versus printed index costs, request sources, OCLC costs, and the request fill rate. (FM)

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# MY LIBRARY IS A COMPUTER TERMINAL!

by

Jean VanGrasstek

and

Donna Rubens

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# MY LIBRARY IS A COMPUTER TERMINAL!

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Keywords: Bibliographic Data Bases, Document Delivery, Special Libraries, Costs, Intelligent Terminals, Networking.
Abstract: My library is a computer terminal. Not exactly true I also have 329 monographs, 516 bound volumes of periodicals, 35 current subscriptions but the bulk of the information needs of my 42 patrons, an interdisciplinary group of scientists including nuclear physicists, microbiologists, biochemists and limnologists, is met with the aid of a Texas Instrument 742 programmable terminal. In 1978, I conducted 640 searches on 49 data bases from Lockheed, SDC or NLM, cataloged 88 books and verified 121 interlibrary requests on OCLC and requested 5072 interlibrary loans and intra-institutional photocopies. The memory in my terminal is sufficient to hold an interlibrary loan request program that asks the copyright questions, assigns automatic CCG's or CCL's, dates and numbers each request, contains all of my patrons on a look-up table and processes the average request in less than five minutes. The cost effectiveness of data base searching over conventional indexes is such that all of these searches were conducted at a cost less than that of a yearly subscription to Chemical Abstracts.

## 1 INTRODUCTION

On July 1, 1974 the Gray Freshwater Biological Institute was established as a branch of the College of Biological Sciences, University of Minnesota. The Institute was built by the Freshwater Biological Research Foundation, lead by Dick Gray, prominent local businessman, amateur scientist and devoted lover of the environment. All of the approximately $4 million needed to construct and equip the facility were raised from private funds, the gifts of concerned citizens who were alarmed at the deterioration of our freshwater resources.

Located 20 miles from the main campus, on the shores of Lake Minnetonka, the Institute is projected to house 6 main laboratories and 100 scientists. Four laboratories: biochemistry, physics, microbiology and toxicology are in operation. Each is lead by a principal investigator, a faculty member of the university. In addition there is a fluctuating community of approximately 40 post doctoral research specialists, technicians, graduate and undergraduate students. Exchange programs have been established with the Swedish Royal Institute of Technology and the University of Lisbon. Collaborations with groups at the Mayo Clinic, the University of Wisconsin, Texas A & M, University of Idaho and various groups in private industry bring frequent visitors to the Institute.

The mission of the Institute, to explore ecological processes at the molecular level, requires some highly sophisticated equipment including Mössbauer

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and fluorescence spectroscopes, a nuclear magnetic resonance instrument and the diverse talents to exploit them. The multidisciplinary nature of the work employs organic chemists, biochemists, nuclear physicists, microbiologists, limnologists, ecologists and engineers.

The geographical isolation of the Institute and extensive information needs of the scientists precluded the development of the traditional carefully chosen and cataloged library collection for the following reasons:

1) Expense. The yearly library budget of $12,000 plus the salary of the librarian did not allow for many purchases (Table 1).

2) Currency. Retrospective materials are little used. This is a group that receives much of its information in preprints and personal correspondence. By the time it is in print, it may already be old. 26.7% of the journal articles requested in the first half of 1979 were published that year; 76.3% were published within the last 6 years; 90.9% within the last 14 years (Table 2).

3) Breadth. In the 4 years of library operation, articles from 1671 different journals have been required. 13,700 total requests were made or an average of 8.2 articles per journal in 4 years or 2.05 articles per journal per year (Table 3). In 1978, materials were borrowed from 25 different subject collections within the university and 17 other libraries (Table 4). Only 35 journals were used with enough regularity to warrant purchase; 329 monographs were added through gifts or purchase.

4) Availability of a viable alternative, a meld of the following:
   a) Bibliographic data bases: NLM, SDC, Lockheed
   b) Current awareness services
   c) OCLC
   d) MINITEX
   e) Author reprint request cards

## 2 BIBLIOGRAPHIC DATA BASES

In 1978, I conducted 640 searches on 49 different data bases from Lockheed Information Systems, System Development Corporation, and the National Library of Medicine at an average cost of $3.47 per search (Table 7). These figures account for telecommunications, line and print charges. Labor costs are not included. Each session in a particular data base is counted as a search. Many of these are of the "quick & dirty" variety. Frequently all that was required was a simple update of the publications of a known author. Exxon R & E Co. uses as many as 20 different data bases with an average of 32 sessions to conduct a "search" (Ref. 1). They report a cost of $112 per search. Dividing this cost by the number of sessions produces a comparable figure of $3.50 per session.

Costs reported for online searching have been steadily declining. Elman reported an average cost of $47.00 in 1975 (Ref. 2), Cooper a cost of $28.41 in 1976 (Ref. 3), Ross found ranges of $3.36 - $20.45 for BRS (Bibliographic Retrieval Service), $4.64 - $46.79 for SDC, $5.56 - $64.29 for Lockheed chemical searches in 1979 (Ref. 4). These figures are only roughly comparable. Elman's includes labor as does Cooper's, but the latter does not include telecommunications. Ross's do not include labor but do include telecommunications.

Online data base searching has proven remarkably cost-effective in comparison to print indexes (Table 8). If only the 1978 print editions of the six leading data bases had been purchased instead of the online time, the additional cost would have been $5,986.45. If the Chemical Abstracts Index for the years 1970-1978 (the range available online during 1978) had also been purchased, an additional cost of $13,005 or a total of $17,005 would

have been incurred. Several of the most valuable bases do not have print equivalents.

Elchesen also reports online searching to be less costly than manual searches, even though his costing of the latter "was based on the fraction of time that the publication was available for use during working hours. At LLL, this latter time is 2008 hr/year (120,480 min/year) per employee." (Ref. 5). This method of figuring costs is meaningful for only the largest libraries, where full-time use of an index would be conceivable.

I hesitate to bring you these results. They may be short-lived. Although Elchesen expects online searching to become less expensive (Ref. 5), Sweet disagrees "none of the major data base producers get more than 3%-5% of their total revenue from online access. The present economics of online searching are phoney, and they're going to have to change." (Ref. 6). Collier also voices concern "a wholesale switch from printed indexes to online could result in considerably higher costs to users if the data base is to be able to continue in economic terms." (Ref. 7). Gaffner recently reported that 30% of the respondents to a survey of online users had cancelled subscriptions to a printed product for which they had online access (Ref. 8). In 1977, NLM reported "library expenditures for online retrieval from NLM data bases surpassed, for the first time, their expenditures for printed counterparts, and NLM dropped several printed bibliographic tools, as the online versions were so overwhelmingly preferred." (Ref. 1)

3 CURRENT AWARENESS SERVICES

Chemical Titles, Chemical Abstracts/Biochemistry Sections and four editions of Current Contents: Life Sciences; Agriculture, Biology & Environmental Sciences; Engineering, Technology & Applied Sciences; and Physical, Chemical & Earth Sciences are routed to patrons who request them. We are considering adding a fifth: Current Contents/ Clinical Sciences! These six account for 56.2% of all requests (Table 9). Van Styvendaele's survey of university scientists found 48.1% of all requests coming from Current Contents/ Physical & Chemical Sciences and Current Contents/ Life Sciences. (Ref. 9). While these current awareness tools account for a great quantity of the requests, they may not be the most relevant to research. Many are for subjects peripheral to current efforts at the Institute.

4 OCLC

OCLC, established as the Ohio College Library Center in 1967, has become the world's major cooperative cataloging data base. In January 1979, it contained over 4 1/2 million catalog records input from 2,537 dedicated terminals, (Ref. 10) representing the cataloging effort of 20 networks, 10 independent libraries and 7 undesignated. (Ref. 11). This massive data base is also available to dial access. For $12 per connect hour, $1.20 per FTU (first time use) and $.50 per logon, we are able to catalog a volume for $2.63 or verify a request for $1.24 (Table 10). Find rate is phenomenal. Two volumes to be cataloged have not been found, 2 had illegal fields that required correction before record could be used, 12 lacked call number. Occasionally new acquisitions will not be in the base but can be circulated uncataloged awaiting records. We currently have 1 such volume. Davis reports a find rate of 65% for a Canadian special library, 76.8% for monographs, 21.8% for pamphlets (Ref. 12).

5. MINITEX

The Minnesota Interlibrary Telecommunications Exchange (MINITEX) "attempts to provide maximum, equitable accessibility to all library

resources in the state for any Minnesota citizen. It offers a system whereby all the academic libraries in the state, together with major public libraries and special libraries, cooperate to share their resources." (Ref. 13). MINITEX handles about 144,000 document requests per year ( Ref. 14). In 1975-76 the fill rate was 96%. "A key to the high fill rate and successful operation of MINITEX is the Minnesota Union List of Serials (MULS) which contains about 70,000 titles. MULS contains holdings of 120 academic, public, government, medical, seminary and special libraries in over 200 locations." (Ref. 15)

The fill rate at MINITEX for the Institute in 1978 was 98.4%, 87.3% for monographs, 99.5% for journals (Table 11).

The memory of my terminal is sufficient to hold an interlibrary loan request program that asks these questions: "Published 1973 or earlier? Owned by library but not available? 5 or less requests in 1979? Subscription ordered? Payment made to Copyright Clearance Center?" Once a question is answered in the affirmative, the request is accepted. Five no's will produce a request denied! CCG's or CCL's (symbols required on all USA interlibrary loan requests to assure the lending library that the request complies with the copyright law) are automatically assigned depending on which question was answered "yes." The patron's ID (his first and last initials) are requested. If in the look-up table, his name and status are printed on the request; if not, the entry of "xx" will allow any name to be entered manually. Dates and sequence numbers are entered once each day and automatically entered on each succeeding request. The efficiency of the system allows the average request to be processed in less than five minutes, including verification.

## 5 AUTHOR REPRINT REQUEST CARDS

Author reprint request cards are the safety valve of the system (Fig. 1). When requests are made in excess of the Guidelines of the Copyright Law, when the reproduction quality of a photocopy is insufficient, when research interests of an author and a requester are compatible enough to warrant correspondence, author requests are filed. Accurate count of number of requests and response rate and time are not available since most requests are made directly by the patron, but for those requests made by the library, 77.1% of requests were received with an average return time of 17.3 days for USA requests, 46.9 days of all requests.

## 6 SUMMARY

These five resources: bibliographic data bases, current awareness tools, OCLC, MINITEX and author reprint request cards, interact in a complex fashion to exploit the potential of the online terminal to supply the information needs of a small but demanding scientific community.

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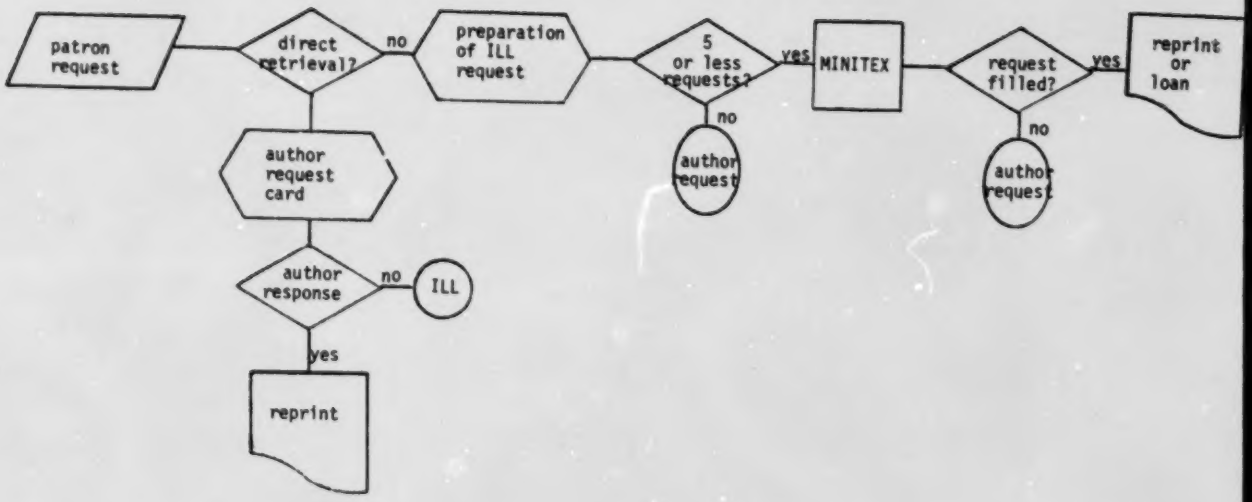
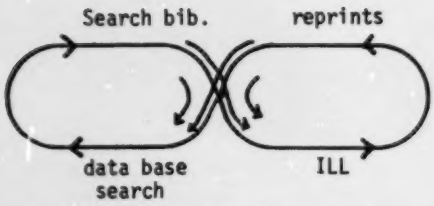
Figure 1



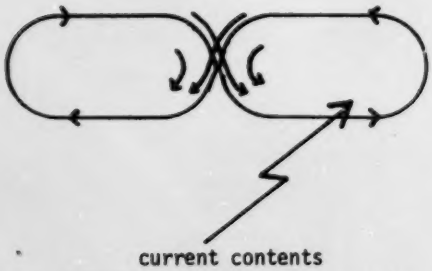

The ILL ⇄ author request system.

Figure 2



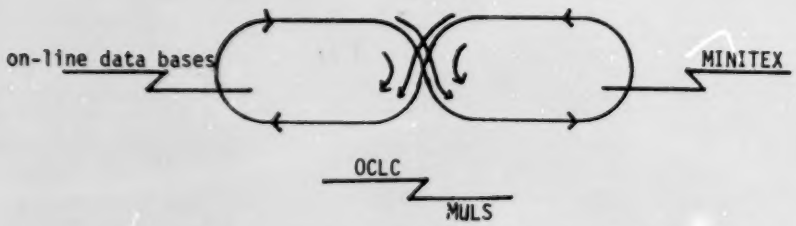

Search and retrieval services generate information needs.

Figure 3




Current awareness services fuel the information retrieval cycles.

Figure 4




Online networks and computer-generated tools enable our library to meet the high information demands.

TABLE 1
EXPENDITURES 1978*

| | | | |
|---|---|---|---|
| Books | | | |
| Monographs | 893.19 | | 7.4 |
| Continuations | 437.75 | | 3.6 |
| NTIS documents | 72.00 | | .6 |
| | | 1402.94 | 11.6 |
| Periodical subscriptions | | 3144.89 | 26.2 |
| Computer Terminal | | | |
| Data base searches# | 3408.99 | | 28.3 |
| Telephone | 823.52 | | 6.8 |
| Maintenance contract | 456.00 | | 3.8 |
| Manuals & indexes | 83.00 | | .7 |
| Supplies | 236.29 | | 2.0 |
| Training | 471.00 | | 3.9 |
| Programming | 100.00 | | .8 |
| Workshops | 76.00 | | .6 |
| | | 5654.80 | 46.9 |
| Miscellaneous supplies | | 328.33 | 2.7 |
| Para-professional salaries | | 1524.72 | 12.6 |
| | | $12,055.68 | 100.0 |

*Exclusive of librarian salary
#Includes surpluses of $450.62 with OCLC and $188.85 with NLM

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TABLE 2
REQUEST PUBLICATIONS DATES 1/79-6/79

| Date | Requests | Percent | Cum. Percent |
|---|---|---|---|
| 1979 | 875 | 26.7 | 26.7 |
| 8 | 1034 | 31.5 | 58.2 |
| 7 | 225 | 6.9 | 65.1 |
| 6 | 106 | 3.2 | 68.3 |
| 5 | 134 | 4.1 | 72.4 |
| 4 | 129 | 3.9 | 76.3 |
| 3 | 92 | 2.8 | 79.1 |
| 2 | 93 | 2.8 | 81.9 |
| 1 | 74 | 2.3 | 84.2 |
| 0 | 65 | 2.0 | 86.2 |
| 69 | 44 | 1.3 | 87.5 |
| 8 | 37 | 1.1 | 88.6 |
| 7 | 33 | 1.0 | 89.6 |
| 6 | 42 | 1.3 | 90.9 |
| 5 | 26 | .8 | 91.7 |
| 4 | 33 | 1.0 | 92.7 |
| 3 | 24 | .7 | 93.4 |
| 2 | 8 | .2 | 93.6 |
| 1 | 21 | .6 | 94.2 |
| 0 | 10 | .3 | 94.5 |
| 50-59 | 99 | 3.0 | 97.5 |
| 40-49 | 21 | .6 | 98.1 |
| 30-39 | 16 | .5 | 98.6 |
| 20-29 | 9 | .3 | 98.9 |
| 10-19 | 2 | .1 | 99.0 |
| 00-09 | 3 | .1 | 99.1 |
| Unknown | 27 | .9 | 100.0 |

TABLE 3
NUMBERS OF REQUESTS 7/75-1978

| Date | Notes | Monthly | Quarterly | Yearly |
|---|---|---|---|---|
| 7/75 | | 45 | | |
| 8 | | 97 | | |
| 9 | | 6 | 148 | |
| 10 | | 64 | | |
| 11 | | 48 | | |
| 12/75 | | 67 | 179 | 327 |
| 1/76 | | 20 | | |
| 2 | Librarian hired | 176 | | |
| 3 | | 199 | 395 | |
| 4 | | 278 | | |
| 5 | | 136 | | |
| 6 | | 193 | 607 | |
| 7 | | 188 | | |
| 8 | Journals routed, LRS & SDC searches begun | 312 | | |
| 9 | | 424 | 924 | |
| 10 | | 313 | | |
| 11 | | 222 | | |
| 12/76 | | 241 | 776 | 2702 |
| 1/77 | | 483 | | |
| 2 | | 285 | | |
| 3 | Keysort control of journals | 506 | 1274 | |
| 4 | | 388 | | |
| 5 | Terminal programmed for MINITEX requests | 397 | | |
| 6 | | 622 | 1407 | |
| 7 | | 503 | | |
| 8 | | 424 | | |
| 9 | | 694 | 1621 | |
| 10 | | 664 | | |
| 11 | | 188 | | |
| 12/77 | | 445 | 1297 | 5599 |
| 1/78 | | 318 | | |
| 2 | | 492 | | |
| 3 | | 662 | 1472 | |
| 4 | NLM searches begun, Reprint request cards | 480 | | |
| 5 | OCLC searches begun | 319 | | |
| 6 | | 343 | 1142 | |
| 7 | Reprint request card service terminated | 445 | | |
| 8 | | 270 | | |
| 9 | | 609 | 1324 | |
| 10 | | 364 | | |
| 11 | | 279 | | |
| 12/78 | | 491 | 1134 | 5072 |

Table 4
LENDING LIBRARIES 1978

| Non-University Libraries | Journals | Requests | % not at U | % of Total |
|---|---|---|---|---|
| MULS | | | | |
| Mayo Clinic | 6 | 7 | 5.7 | .1 |
| Misc. MN* Libraries (10) | 11 | 14 | 11.5 | .3 |
| Misc. ND# Libraries (3) | 7 | 9 | 7.4 | .2 |
| Total MULS | 24 | 30 | 24.6 | .6 |
| Not in MULS | | | | |
| University of Wisconsin | 10 | 20 | 16.4 | .4 |
| Center for Research Libraries | 2 | 6 | 4.9 | .1 |
| British Library. Lending Division | 26 | 45 | 36.9 | 1.0 |
| Total not in MULS | 38 | 71 | 58.2 | 1.5 |
| Unavailable through MINITEX | 17 | 22 | 17.2 | .5 |
| Subtotal - Non-University Libraries | 79 | 123 | 100.0 | 2.6 |
| University Libraries (25) | 913 | 4486 | 0 | 97.4 |
| TOTAL | 992 | 4609 | 100.0 | 100.0 |

Table 5
NUMBER OF JOURNALS BY LENDER 1978

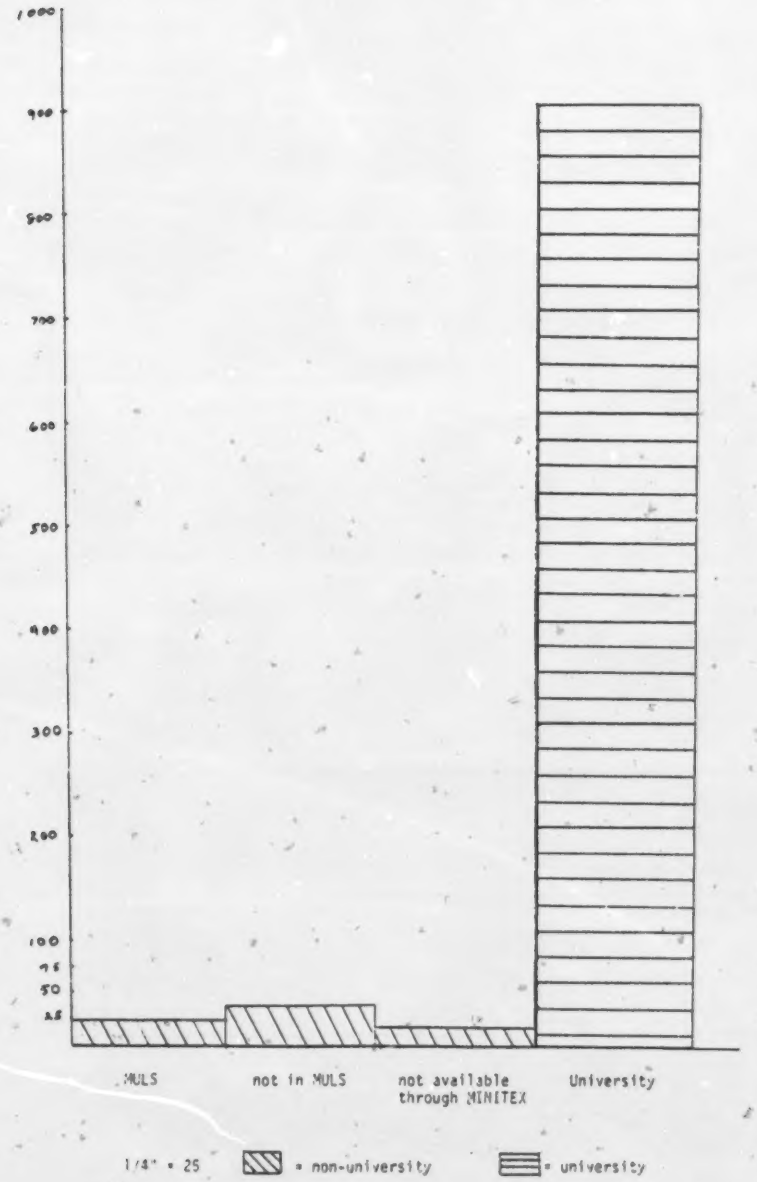

Table 6
NUMBER OF REQUESTS BY LENDER 1978

TABLE 7
BIBLIOGRAPHIC DATE BASE COSTS 1978

| | LRS | | SDC | | NLM | | |
|---|---|---|---|---|---|---|---|
| Date | Cost | # of searches | Cost | # of searches | Cost | # of searches | Total |
| 1/78 | 229.36 | 80 | 55.18 | 3 | 0 | 0 | 284.54 |
| 2/78 | 275.02 | 54 | 24.64 | 2 | 0 | 0 | 299.66 |
| 3/78 | 64.45 | 23 | 11.80 | 1 | 0 | 0 | 76.25 |
| 4/78 | 159.54 | 41 | 38.30 | 4 | 149.98 | 44 | 347.82 |
| 5/78 | 77.81 | 25 | 0 | 0 | 111.60 | 41 | 189.41 |
| 6/78 | 116.13 | 33 | 0 | 0 | 48.79 | 29 | 164.92 |
| 7/78 | 131.34 | 31 | 0 | 0 | 58.53 | 23 | 189.87 |
| 8/78 | 126.28 | 27 | 0 | 0 | 29.31 | 18 | 155.59 |
| 9/78 | 70.01 | 22 | 0 | 0 | 49.36 | 24 | 119.37 |
| 10/78 | 165.84 | 30 | 14.35 | 1 | 26.48 | 17 | 206.67 |
| 11/78 | 71.78 | 20 | 0 | 0 | 43.71 | 21 | 115.49 |
| 12/78 | 49.22 | 11 | 0 | 0 | 21.39 | 15 | 70.61 |
| | $1,536.78 | 397 | $144.27 | 11 | $539.15 | 232 | $2,220.20 |

| | | |
|---|---|---|
| Average Charges per Month | | $185.02 |
| Average Charges per Search | | 3.47 |
| Offline prints (4/page NLM) | 7064 | |
| Online prints (3/search) | 1920 | |
| | 8984 | |
| Average Charge per Citation | | $ .242 |

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TABLE 8
ONLINE VERSUS PRINTED INDEX COSTS 1978

| Online Files<br>Name | Range | % of Total | Cost | Annual Cost | Name | |
|---|---|---|---|---|---|---|
| CA CONDENSATES & CASIA | 1970- | 34.3 | 761.05 | 4050.00 | Chemical Abstracts Index & Guide | 1978 |
| BIOSIS | 1969- | 13.2 | 292.98 | 685.00 | Biological Abstracts Index & Bioresearch Index | 1978 |
| MEDLINE | 1966- | 11.2 | 249.04 | 150.00 | Index Medicus | 1978 |
| SCISEARCH | 1974- | 7.6 | 168.80 | 1100.00 | Science Citation Index | 1978 |
| TOXLINE | 1965- | 4.9 | 109.65 | * | No print equivalent | |
| CANCERLINE | 1963- | 4.1 | 91.36 | * | " " " | |
| ENERGYLINE | 1971- | 3.1 | 68.92 | 375.00 | Energy Information Abstracts | 1978 |
| CANCERPROJ | 1976- | 1.9 | 43.14 | * | No print equivalent | |
| CHEMLINE | current | 1.6 | 34.51 | * | " " " | |
| INSPEC | 1969- | 1.5 | 32.76 | 1200.00 | Physics Abstracts, Electrical & Electronic Abstracts Computer & Control Abstracts | 1978 |
| Misc. minor bases (21 bases under $20 each) | | 4.6 | 99.36 | | | |
| Telecommunications | | 7.0 | 155.93 | | | |
| Search/Save | | .6 | 13.99 | | | |
| Total | | 100.0% | $2220.20 | $7560.00 | | |
| Cost of bases having print equivalents | | | | 1573.55 | | |
| Saving of searching over 1978 print costs | | | | 5986.45 | | |
| Chemical Abstracts Index 1970-77 | | | | 13005.00 | | |
| Saving of searching over purchasing full Chemical Abstracts Index (1970-78) & 1978 print equivalents for other indexes | | | | $17,055.00 | | |

TABLE 9
REQUEST SOURCES 1978

| | Requests | Percent |
|---|---|---|
| **Routed Journals** | | |
| Current contents: life sciences | 1505 | 29.7 |
| Current contents: agriculture, biology & environmental sciences | 768 | 15.1 |
| Current contents: physical, chemical & earth sciences | 360 | 7.1 |
| Current contents: engineering, technology & applied sciences | 32 | .6 |
| Total Current contents | 2665 | 52.5 |
| Chemical titles | 137 | 2.7 |
| Chemical abstracts: biochemistry sections | 50 | 1.0 |
| Total Routed Journals | 2852 | 56.2 |
| **Data Bases** | | |
| MEDLINE | 198 | 3.9 |
| CACondensates | 147 | 2.9 |
| TOXLINE | 112 | 2.2 |
| BIOSIS | 95 | 1.9 |
| Energyline | 51 | 1.0 |
| SCISearch | 44 | .9 |
| Cancerline | 27 | .5 |
| INSPEC | 7 | .1 |
| Cancerproj | 6 | .1 |
| CAB | 4 | .1 |
| Dissertation Abstracts | 3 | .1 |
| Total Data Bases | 694 | 13.7 |
| **Misc. Printed Sources** | | |
| Journals | 865 | 17.1 |
| Monographs | 281 | 5.5 |
| Publishers' lists | 13 | .3 |
| Bibliographies | 102 | 2.0 |
| Books in print | 17 | .3 |
| ECOL Catalog | 8 | .3 |
| Preprints | 7 | .1 |
| Total Printed Sources | 1293 | 25.5 |
| **Misc. Other** | | |
| Unknown | 185 | 3.6 |
| Personal Communications | 48 | 1.0 |
| Total Other | 233 | 4.6 |
| TOTALS | 5072 | 100.0 |

TABLE 10
OCLC COSTS 1978

| Date | Tymshare | Updates | FTUs # | FTUs $ | Cards # | Cards $ | Total Catalog | MINITEX Verified | Total Searches | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 5/78 | 49.29 | 0 | 0 | 0 | 46 | 0 | 0 | 7 | 9 | 51.08 |
| 6/78 | 111.90 | 133 | 52 | 69.60 | 445 | 17.36 | 185 | 17 | 202 | 198.86 |
| 7/78 | 87.59 | 101 | 17 | 20.40 | 214 | 7.70 | 118 | 21 | 139 | 115.69 |
| 8/78 | 25.29 | 0 | 3 | 3.60 | 106 | 3.82 | 3 | 14 | 17 | 32.71 |
| 9/78 | 53.79 | 3 | 9 | 10.80 | 35 | 1.26 | 12 | 33 | 45 | 65.85 |
| 10/78 | 30.50 | 4 | 6 | 10.25 | 149 | 5.36 | 10 | 8 | 18 | 46.11 |
| 11/78 | 30.40 | 0 | 1 | 1.75 | 19 | .68 | 1 | 14 | 15 | 32.83 |
| 12/78 | 6.19 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 5 | 6.19 |
| | $394.95 | 241 | 88 | $116.40 | 1014 | $37.97 | 329 | 121 | 450 | $549.32 |

AVERAGE COST TO CATALOG A VOLUME

| | |
|---|---|
| Tymshare | .878 |
| FTU | 1.323 |
| Cards | .431 |
| Total* | 2.63 |

AVERAGE MINITEX VERIFICATION $1.24

*Total does not include labor costs

TABLE 11
REQUEST FILL RATE 1978

| Type | Request | % of Total | Unfilled | Fill Rate |
|---|---|---|---|---|
| Monographs | 464 | 9.1 | 59 | 87.3% |
| Journals | 4608 | 90.9 | 22 | 99.5 |
| Total | 5072 | 100.0 | 81 | 98.4% |